BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 2: e26093
doi: 10.3897/biss.2.26093

OPEN ACCESS

Conference Abstract

Scanning Electron Microscopy as a Tool to Observe the Effects of Simulated Conservation Treatment on Herbarium Specimens

Magdalena Grenda-Kurmanow ‡

‡ Academy of Fine Arts in Warsaw, Warsaw, Poland

Corresponding author: Magdalena Grenda-Kurmanow (grenda.magdalena@gmail.com)

Received: 23 Apr 2018 | Published: 13 Jun 2018

Citation: Grenda-Kurmanow M (2018) Scanning Electron Microscopy as a Tool to Observe the Effects of Simulated Conservation Treatment on Herbarium Specimens. Biodiversity Information Science and Standards 2: e26093. https://doi.org/10.3897/biss.2.26093

Abstract

This paper presents the Scanning Electron Microscopy (SEM) observations conducted for the project "Heritage preservation and ethnobotany. Analysis of the influence of conservation treatment on genetic material comprised in historic herbaria“ (project no. 2014/13/N/HS2/03118) funded by the National Science Centre in Poland.

The main aim of the project is to establish if treatment methods used by herbarium conservators and mounters in different countries are harmful for the DNA material comprised in herbarium specimens. In order to analyse this problem the author conducted an international survey among specialists with documented experience in herbarium treatment. The next step was the evaluation of the results and the choice of materials. The chosen materials were then applied to samples of herbarium specimens, artificially aged in the climatic chamber, and subjected to DNA analysis.

The results of the survey illustrated the variety of the materials used to treat and mount specimens. Some of them, such as methyl cellulose, were used in different concentrations and different degrees of polymerization. The project limitations determined the selection of materials for further testing, particularly when it comes to the concentration of a particular adhesive/consolidant. At the same time the main assumption was to identify versions of the

© Grenda-Kurmanow M. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

material that can effectively penetrate the specimen in order to intensify the potential influence on its DNA.

Dessicated plant specimens are not a common material in conservation research because their structure is highly heterogenic, fragile and brittle. Moreover, the materials used for mounting and conservation treatment are most often adapted from bookbinding and paper conservation disciplines. They are not always suitable for the treatment of botanic material and may cause damage. When observations of stratigraphic samples under a traditional microscope proved unsatisfactory, the potential of SEM imaging was examined.

SEM turned out to be a very useful tool to observe the effects of simulated conservation treatments conducted on herbarium specimen samples, but only when samples were coated with gold. The conclusions from these observations informed decisions about what versions of the conservation and mounting materials should be used for further testing. Additionally, some samples were observed after artificial aging in aclimatic chamber. It enabled us to observe the degradation of the layers of materials applied onto the specimens. The analysis focussed on the leaves of two species, *Fragaria vesca* (wild strawberry) and *Arabidopsis thaliana* (thale cress).

Keywords

herbarium conservation, SEM, adhesives, DNA

Presenting author

Magdalena Grenda-Kurmanow

Presented at

SPNHC POSTER presentation

Funding program

"Heritage preservation and ethnobotany. Analysis of the influence of conservation treatment on genetic material comprised in historic herbaria“ (project no. 2014/13/N/HS2/03118) funded by the National Science Centre in Poland

Grant title

"Heritage preservation and ethnobotany. Analysis of the influence of conservation treatment on genetic material comprised in historic herbaria“ (project no. 2014/13/N/HS2/03118)

Hosting institution

Academy of Fine Arts in Warsaw, Poland